

SPOTTED B-STARS: EXPLORING A NEWLY DISCOVERED MAGNETIC B STAR PHENOMENON

Bernard McNamara

New Mexico State University

GO40018

We propose to examine 48 B stars in the Kepler field of view that have light curves suggestive of the presence of star-spots. Magnetic fields, presumably associated with these star-spots, are known to be present in a number of δ Cephei (δ Cep) and Slowly Pulsating B stars (SPBs), but their origin and impact on stellar rotation, pulsations, and element diffusion are poorly understood. Therefore, this proposal addresses two areas of stellar astrophysics that are infrequently studied: magnetism and rotation. This project will address the following questions: How prevalent are spots on B stars, what common morphologies are present in the light curves of these stars, and is spot substructure present? Over what duration are the star-spot amplitudes stable? How many spots are required to match the light curves and what are the spot sizes, locations, and brightnesses? What are the rotation periods of these stars? After subtraction of the star-spot signal, are any pulsation frequencies present that can be used for subsequent asteroseismology analysis? Observations for thirty-eight of our target stars are requested for a full year in the long cadence mode. Short cadence observations to track possible changes in the star-spot substructure are requested for 10 stars, divided into groups of 5 to 7 stars per quarter. This will allow variations to be sought over a 1 year time period.